The role of mating-relevant factors in the perpetration of digital dating abuse

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Abstract

Previous research has explored offline intimate partner violence from an evolutionary perspective, primarily focusing on the role of individual differences inperpetration and victimisation. However, a current form of intimate partner violence is digital dating abuse, which involves abuse towards a romantic partner, occuring online through the use of electronic communication technology. This form of abuse differs from offline abuse, in that physical proximity is not required. Although research has focused on the effects digital dating abuse has on victims, little research has focused on the perpetration of digital dating abuse. This is important, as research focused on perpetration can inform a wide range of initiatives geared towards understanding the factors which drive this behaviour. Recent research has focused on evolutionary mating-relevant factors that drive the perpetration of digital dating abuse. Here, we extended and replicated previous work by reporting two studies (study 1, $n = 114$; study 2, $n = 162$) which explored the roles of mate value discrepancy, intrasexual competition, and relationship-contingent self-esteem in the perpetration of digital dating abuse. We found that mate value discrepancy (study 1 and 2) and intrasexual competition (study 2) positively predicted the perpetration of digital dating abuse. To our knowledge, this paper is the first to provide support that those who report high intrasexual competition, engage in greater levels of digital dating abuse, thus furthering theoretical advancements in this field by showing digital dating abuse is a mate retention tactic. Our findings further our understanding of online behaviour in romantic relationships through an evolutionary psychological lens.

Keywords; digital dating abuse, mate retention, mate value discrepancy, intrasexual competition, cyber dating abuse

The role of mating-relevant factors in the perpetration of digital dating abuse

Intimate Partner Violence (IPV) involves acts of violence and aggression towards a romantic partner (Larsen, 2016). Displays of violence may be physical, sexual, and/or psychological (Breiding et al., 2015). This signifies the many forms that IPV can take, and how it can be multifaceted (Brown & Hegarty, 2018). Although online and offline abuse both lead to negative outcomes for victims, a key factor that distinguishes online and offline abuse is that physical proximity is not required when perpetrating online abuse (Bennett et al., 2011). Social networking sites aid the perpetration of dating abuse as romantic partners can communicate instantly (Liebana-Cabanillas et al., 2014). There is an increase in research focusing on offline intimate partner violence, known as digital dating abuse (Van Ouytsel et al., 2017).

Digital dating abuse involves abuse directed towards a romantic partner through various forms of electronic information technology, including social networking sites (Zweig et al., 2013). Electronic intrusion (a facet of digital dating abuse) involves intruding a romantic partner's digital privacy using social media (Reed et al., 2015). Acts of electronic intrusion can include monitoring a partner's whereabouts online (Burke et al., 2011; Reed et al., 2016), deleting friends and ex-romantic partners on social media (Stonard et al., 2015), posting humiliating photographs or comments relating to a partner (Lyndon et al., 2011; Patchin & Hinduja, 2011) or threatening a partner online (Machimbarrena et al., 2018; Zweig et al., 2013).

Research highlights that over 30% of students perpetrate digital dating abuse in romantic relationships (Smith et al., 2018; Villora et al., 2019), and 50% of students report victimisation of digital dating abuse (Borrajo et al., 2015). While students are particularly vulnerable, research posits that younger adults have a higher vulnerability to both digital dating abuse victimisation and perpetration than older adults (Lenhart et al., 2017), which may be because younger adults are the

highest users of technology (Brown & Hegarty, 2018). Furthermore, younger individuals are more likely to engage in intimate partner violence than older adults (Pazhoohi et al., 2016).

Victims of digital dating abuse suffer from poor mental and emotional wellbeing (Hancock et al., 2017; Lu et al., 2018), including distress, depression, anxiety, isolation, suicide ideation, and substance misuse (Lu et al., 2018; Teten et al., 2009). Whilst much is known about victim's experiences of digital dating abuse, little research investigates the motivations behind perpetrating such abuse (Stonard et al., 2014). To prevent perpetration of digital dating abuse through developing appropriate interventions, research must be conducted to investigate the factors which may drive one to perpetrate digital dating abuse.

Though research surrounding perpetration of digital dating abuse is limited, recent research has focused on individual differences, with findings showing that aggression (Borrajo et al., 2015; Schnurr et al., 2013), romantic jealousy (Deans & Bhogal, 2019; Elphinston & Noller, 2011), and attachment anxiety have been found to positively predict perpetration of digital dating abuse (Reed et al., 2015; 2016; Wright, 2015). The evidence surrounding the role of gender in the perpetration of digital dating abuse has been mixed (Bhogal et al., 2019; Hancock et al., 2017; See Taylor & Xia, 2018 for a discussion). For example, some research finds that men perpetrate digital dating abuse to a greater degree than women (Deans & Bhogal, 2019), whereas some research finds that men and women perpetrate digital dating abuse relatively equally, and other research finding that women perpetrating digital dating abuse to a greater degree compared to men (Bennett et al., 2011; Van Ouytsel et al., 2017).

Van Ouytsel et al. (2017) argue that research into digital dating abuse often lacks a theoretical approach. Recent research has adopted an evolutionary framework to understand the perpetration of digital dating abuse, suggesting digital dating abuse is a mate retention tactic, to

protect one's investment into a relationship. Recent research suggests that digital dating abuse as a cost-inflicting mate retention tactic with the aim of keeping a relationship intact, and deterring mating rivals (Bhogal & Howman, 2019; Bhogal et al., 2019). In this study, we replicate and extend these previous findings by adopting an evolutionary framework to understanding the perpetration of digital dating abuse. According to Van Ouytsel et al. (2017), using theoretical frameworks to understand digital dating abuse enables researchers to design effective interventions, and to identify key variables associated with the perpetration of this behaviour.

Mate Value

Previous research finds that mating factors such as mate value discrepancy significantly predicts digital dating abuse perpetration (Bhogal & Howman, 2019; Bhogal et al., 2019). Mate value refers to the number of characteristics possessed by an individual which contribute to their overall mate value (Fisher et al., 2008). Examples of characteristics which contribute to one's mate value include physical attractiveness, maturity, sense of humour, and emotional stability.

There is often conflict between perceived self-mate value and perceived partner mate value, leading to mate value discrepancy (Goetz & Maria, 2019). Mate value discrepancy refers to the difference in perceived mate quality between partners. If there are large mate value discrepancies between a couple, this can often lead to mate retention behaviours, employed to protect a romantic partner from mate poachers (Holden et al., 2014; Miner et al., 2009).

Mate poaching is an adaptive tactic used to steal someone's romantic partner to increase one's own reproductive success (Arnocky et al., 2013). If mate guarding tactics are not employed, one's romantic partner faces an increased likelihood of being poached by a competitor (Jonason et al., 2010). As a result of the risk posed by mate poaching, mate retention tactics are employed to

protect one's investment in a romantic relationship and to protect a romantic partner from romantic rivals. Such behaviours may be benefit-provisioning (such as gift giving or compliments) and/or cost-inflicting (such as manipulating a romantic partner, see Davis et al., 2018). Cost-inflicting behaviours such as abuse are often employed to prevent a partner from leaving a romantic relationship (Miner et al., 2009). Digital dating abuse may be a cost-inflicting mate retention tactic used to protect a relationship as it involves the engagement in risky and manipulative behaviours such as checking a partner's whereabouts online (Bhogal et al., 2019). In support, Brem et al. (2014) found that individuals use Facebook as a mate retention tactic to protect a romantic partner.

The relationship between mate value discrepancy and digital dating abuse perpetration was first explored by Bhogal and Howman (2019) who found that low perceived self-mate value and high perceived partner mate value significantly predicts the perpetration of digital dating abuse. This was further replicated by Bhogal et al. (2019) who found that mate value discrepancy was positively associated with perpetration of digital dating abuse, suggesting that digital dating abuse may be a mate retention tactic. Bhogal and Howman (2019) explored whether attachment style and mate value discrepancy predicted the perpetration of digital dating abuse in a UK sample of 180 participants. They found that those who reported their partners as having greater mate value than themselves reported perpetrating greater levels of digital dating abuse. Furthermore, Bhogal et al. (2019) extended this research by conducting two studies examining the role of mate value discrepancy in two independent UK samples, successfully replicating the findings of Bhogal and howman (2019). The authors findings were consistent with that Bhogal and Howman (2019).

In the interest of scientific replication, study 1 was conducted as a conceptual replication study aiming to replicate previous research finding a link between mate value discrepancy and digital dating abuse (Bhogal & Howman, 2019; Bhogal et al., 2019). However, we attempted to

assess this relationship using a measure of mate value not used in previous research outlined above. Previous research has used the Kirsner et al. (2003) mate value scale, however for study 1, we used the general mate preference scale (Buss, 1989). We felt this was necessary to examine the strength and robustness of the finding that mate value discrepancy predicts digital dating abuse.

A priori hypothesis 1: Mate value discrepancy would positively predict digital dating abuse.

Study 1

Method

Design and participants

A correlational design was adopted to explore whether mate value discrepancy was related to the perpetration of digital dating abuse. The sample consisted of 114 heterosexual people (88 women, 26 men, *Mage*=20.87 years old, *SD*=2.22) from the public in the United Kingdom, recruited via opportunity sampling. on Qualtrics (an online survey builder). Participants took part via Qualtrics and survey links were shared on social media sites such as Twitter and Facebook. In addition, undergraduate psychology students took part via the host universities departmental research participation scheme.[1] Participants were required to be in a romantic relationship at the time of participation (*M*relationship length=22.31 months, *SD*=31.08).

Materials

Mate Value

The 20-item *General Mate Preference* scale (Buss, 1989) was used to measure participants' self-perceived mate value, and that of their current partner. The scale lists characteristics which are scored on a 7-point Likert scale ranging from 1 (extremely low) to 7 (extremely high). High scores reflect high mate value, and low scores reflect low mate value. Items measure traits such as

[1] The recruitment method and procedural facets were the same for study 1 and 2.

"*kindness*" and "*dependability*". For study 1, participants completed this scale twice, once where they rated themselves, and one where they rated their partner (counterbalanced through the randomizer function on Qualtrics). Cronbach alpha is reported for all reliability analyses across both studies. The general mate preference scale was reliable in our sample (self-mate value, α=.82 and partner mate value, α=.85). Mate value discrepancy was calculated by computing the difference between self and partner mate value scores (consistent with Bhogal & Howman, 2019; Bhogal et al., 2019).

Digital Dating Abuse

We used the 19-item perpetration sub-scale of the *Digital Dating Abuse scale* (Reed et al., 2016), which measures participants' experiences of perpetrating digital dating abuse towards their partner. Participants scored each item on how often they have carried out each behaviour towards their current partner, which are all measured on a 4-point Likert scale ranging from 0 (Never) to 3 (Very often). An example item is "*Monitored my partner's whereabouts*". Higher scores reflected greater perpetration of digital dating abuse, and low scores reflect low perpetration of digital dating abuse. The scale had acceptable reliability in our sample (α =.65).

Procedure

For both studies reported in this paper, once participants provided informed consent, they were asked to provide demographic details and complete the questionnaires outlined above, and in subsequent methods sections. Finally, participants were fully debriefed online. Data were collected anonymously, online. For both studies, the order of questionnaires was counterbalanced using the randomizer function on Qualtrics.

Results

All analyses in this paper were performed using JASP (JASP team, 2018). Values derived from the analyses are presented in Table 1. For study 1, hierarchical linear regression was conducted to predict the perpetration of digital dating abuse (mean=21.78, *SD*=2.62) from mate value discrepancy[2] (mean difference=-.16, *SD*=.80) whilst controlling for age, relationship length, and the participants' gender. VIF and Tolerance values in Table 1 show that there was no multicollinearity in our model.

Age, relationship length, and sex were added to block 1 of the model. Here, they accounted for 5.1% of the variance in digital dating abuse (adjusted R^2=.026), $F(3, 110)=1.99$, p=.120. Mate value discrepancy was added to block 2 of the model. This resulted in a R^2 change of .087 and a statistically significant F change (.001).

The final model explained 13.8% of the variance in digital dating abuse, $F(4, 109)=4.37$ (adjusted R^2=.106), p=.001, Cohens f^2=.16, Durbin-Watson=2.04. Mate value discrepancy significantly, positively predicted digital dating abuse, supporting hypothesis 1.

Study 2

The findings from study 1 show that when we use an alternative measure of self-perceived mate value than used in previous research, higher mate value discrepancies predict greater levels of digital dating abuse. In the interest of methods and conceptual replication, study 1 adds to the previous research showing the link between mate value discrepancy and digital dating abuse (Bhogal & Howman, 2019; Bhogal et al., 2019). This finding adds to the robustness of the finding that digital dating abuse could be a cost-conflicting mate retention tactic.

Consistent with previous research, we were interested in exploring the role of alternative and previously explored mating-relevant factors in the perpetration of digital dating abuse. We

[2] Self-mate value = 4.91 (*SD* = .67). Partner mate value = 5.07 (*SD* = .76).

therefore conducted study 2 to 1) replicate the relationship between digital dating abuse and mate value discrepancy using a further alternative measure of mate value and 2) to examine the role of intrasexual competition and relationship contingent self-esteem in the perpetration of digital dating abuse.

Psychological science is currently in a replication crisis whereby researchers fail to replicate empirical findings, casting doubt on both the strength and reliability of existing findings (Earp & Trafimow, 2015). Therefore, this highlights the importance of replication. Previous research exploring the role of mate value discrepancy and digital dating abuse has used the 17-item Mate Value Inventory Short Form (Kirsner et al., 2003). In this scale, participants are asked to rate both self and partner mate value on facets such as, attractive face, desire intimacy, and good parenting skills. In study 1, we used a similar scale which lists characteristics which form one's mate value, finding support for the relationship between mate value discrepancy and digital dating abuse.

Where items in the Kirsner et al. (2003) scale have shown to be reliable in previous research (Bhogal & Howman, 2019; Bhogal et al., 2019), to date, no previous research has yet investigated the relationship between digital dating abuse perpetration and mate value discrepancy using the *'Mate Value Scale'* (Edlund & Sagarin, 2014). This is a more concise scale measuring self-perceived mate value with the items being presented more subtly than in the *Mate Value Inventory Short Form* (Kirsner et al., 2003). As a result, study 2 aimed to investigate whether the relationship between mate value discrepancy and digital dating abuse perpetration showing this study's methodological importance.

Intrasexual competition

Intrasexual competition refers to the competition each sex faces from same-sex romantic rivals when attempting to attracting romantic partners and increasing their reproductive success

(Keys & Bhogal, 2018). This can involve the use of tactics such as rival derogation whereby individuals promote themselves as more attractive than their rivals by attempting to make their rivals appear less attractive (Buss & Dedden, 1990; Polo et al., 2018). Research posits that those who engage in high levels of intrasexual competition fear being replaced by mates who they perceive to be more desirable than themselves (Miner et al., 2009) and engage in acts of aggression towards romantic rivals (Keys & Bhogal, 2018). Therefore, intrasexual competition may act as a mate retention behaviour to prevent mate poaching (Arnocky et al., 2018). Due to fear of replacement by high-valued competitors, it can be suggested that intrasexual competition may predict the perpetration of digital dating abuse to protect a romantic partner from being poached by a romantic rival.

To our knowledge, the relationship between intrasexual competition and digital dating abuse has only been explored by Bhogal et al. (2019) who found no support for this relationship. However, Bhogal et al. (2019) used the self-report measure of intrasexual competition (Buunk & Fisher, 2009). Karimi-Malekabadi et al. (2019) outline key limitations of using this scale to measure intrasexual competition. Karimi et al. (2019) suggest that this scale fails to consider advances in psychological literature, whereby recent literature suggests that mate preferences are multi-dimensional (Atari & Jamali, 2016). For example, Buss's (1988) bi-tactic intrasexual competition framework constitutes self-promotion and rival-derogation and the five-factor model of human mate preferences (Atari et al., 2016; 2017), which Buunk and Fisher's (2009) scale does not incorporate. This model gives rise to the importance of studying long-term mate preferences by summarising preferences into five key categories which highlight sex differences in mate preferences, kindness/dependability, attractiveness/sexuality, status/resources, education/intelligence, and religiosity/chastity (Karimi et al., 2019). Despite this, the *'Scale for*

Intrasexual Competition' (Buunk & Fisher, 2009) only considers rival-derogation components of intrasexual rivalry. Therefore, a significant limitation of this scale is that it is unable to reliably measure self-promotion strategies used during intrasexual competition behaviours. This has many theoretical implications on the relationship between intrasexual competition and mate retention, whereby mate scarcity predicts willingness to engage in intrasexual competitive behaviours against mate poachers (Arnocky et al., 2014). As a result, Karimi et al. (2019) developed the *'Intrasexual Rivalry Scale'* to connect these models and components to create a more efficient measure of intrasexual competition. Therefore, here, we used the Intrasexual Rivalry Scale to re-examine whether intrasexual competition predicts the perpetration of digital dating abuse, emphasising the methodological importance of the study.

In addition to intrasexual competition, for study 2, we aimed to extend and expand upon previous research exploring the role of self-esteem in the perpetration of digital dating abuse. Mate retentions tactics are linked to self-esteem, as previous research shows that those who report low self-esteem engage with greater levels of cost-inflicting mate retention tactics (see Holden et al., 2014). As those with lower self-esteem tend to engage in greater levels of offline intimate partner violence (see Lewis et al., 2002), we, consistent with Bhogal et al. (2019) believe that the role of self-esteem in online intimate partner violence should be explored further. Furthermore, as derogation is a key facet of cost-inflicting mate retention and digital dating abuse, previous research has explored the association between self-esteem and digital dating abuse (Bhogal et al., 2019) finding no support.

Bhogal et al. (2019) used Rosenbergs (1965) measure of self-esteem, which focuses on an individual's general (explicit self-esteem) self-esteem, ignoring relationship specific self-esteem. Holden et al. (2018) argue that when exploring self-esteem in relationships, researchers should

view self-esteem as multifaceted, in that we should be exploring relationship contingent self-esteem, rather than general self-esteem. Therefore, in study 2, we expanded on the work of Bhogal et al. (2019) by exploring the role of relationship contingent self-esteem rather than general self-esteem.

Aims and hypotheses:

The aim of study 2 was to replicate the finding that mate value discrepancy predicts digital dating abuse, and to further explore the role of intrasexual competition and relationship contingent self-esteem in digital dating abuse.

We hypothesised the following:

A priori hypothesis 1: Mate value discrepancy would positively predict digital dating abuse.

Exploratory hypothesis 2: Intrasexual competition would be related to digital dating abuse..

Exploratory hypothesis 3: Relationship contingent self-esteem would be related to digital dating abuse.

Method

Design and participants

A correlational design was adopted to explore whether mate value discrepancy, intrasexual rivalry, and relationship contingent self-esteem predicted digital dating abuse. The sample included 162 heterosexual people from the public in the UK (144 women, 18 men, *Mage*=26.32 years old, *SD*=9.09). Participants were required to currently be in a romantic relationship (*M*relationship length=38.04 months, *SD*=59.23).

Materials

Relationship contingent self-esteem

The 11-item relationship contingent self-esteem scale (Knee et al., 2008) measures relationship specific self-esteem. Items are measured on a 1 (Not at all like me) to 5 (very much like me) Likert scale. An example from this scale includes "*I feel better about myself when it seems like my partner and I are emotionally connected".* The scale was reliable in our sample (α=.86).

Intrasexual rivalry scale

The Intrasexual Rivalry scale (Karimi et al., 2019) includes 16-items measuring the extent to which individuals compete with members of the opposite sex for mates (intrasexual competition). There are two versions of the scale dependent on one's sex: male and female. Each item of the scale remains the same; however, wording differs according to the participants' sex. For example, in the male version, participants respond to statements such as *"I look for negative points in kind and nice men".* Whereas in the female version, participants respond to the same statement with female pronouns, for example, *"I look for negative points in kind and nice women"*. Responses are measured on a 7-point Likert scale ranging from 1 (not at all applicable) to 7 (completely applicable) and the scale was reliable in our sample (α=.78).

The Mate Value Scale

The mate value scale (Edlund & Sagarin, 2014) includes 4-items measuring perceptions of self-mate value. An example item includes *"Overall, how good of a catch are you?*" Participants completed this scale twice; once where they rated themselves, and a second time when they measured their partners mate value. To examine perceived partner- mate value, the same questions were repeated, with *"your"* being changed to *"your partner"* in the first two items and substituting *"your partner"* for *"your"* in the last two items. For example, to measure partner mate value; *"Overall, how good of a catch are you?"* was altered to "*Overall, how good of a catch is your partner?"* Responses are measured on a 7-point Likert scale ranging from 1 (extremely

undesirable, very much lower than average, very bad catch) to 7 (extremely desirable, very much higher than average, very good catch).

Mate value discrepancy was calculated by subtracting partner mate value from self-mate value, consistent with study 1. Both self and partner items were reliable in our sample; self (α=.86), partner (α=.90).

Digital Dating Abuse

We used the 19-item perpetration sub-scale of the *Digital Dating Abuse* scale used in study 1. The scale was reliable in our sample (α=.89).

Results

Bivariate Pearson's correlations between all variables are presented in Table 2. Tolerance and VIF values are presented in Table 3 showing that there was no multicollinearity in the model.

Table 2 shows that there was a significant positive, small correlation between intrasexual rivalry and digital dating abuse. There was also a significant, positive, small correlation between digital dating abuse and mate value discrepancy. There was also a negative, small, significant correlation between relationship contingent self-esteem and mate value discrepancy, in that those who had low mate value discrepancy reported higher relationship contingent self-esteem.

Hierarchical multiple regression

Hierarchical multiple regression was conducted to predict the perpetration of digital dating abuse (Mean = 23.17, *SD* = 5.99) from mate value discrepancy[3] (Mean difference=-.3.78,

[3] Self-mate value = 18.30 (*SD* = 4.60). Partner mate value = 22.08 (*SD* = 4.31).

SD=5.08), relationship contingent self-esteem (Mean=38.11, *SD*=7.94), and intrasexual rivalry (Mean= 32.98, *SD*=6.29), whilst controlling for relationship length, age, and gender.

Relationship length, age, and gender were added to block 1, explaining 3.4% of the variance in digital dating abuse (adjusted R^2=.015), $F(3, 152)=1.76$, p=.157. Mate value discrepancy, relationship contingent self-esteem, and intrasexual rivalry were added to block 2 of the model. This resulted in a R^2 change of .085 and a F change of 4.78.

The model was statistically significant and explained 11.8% of the variance in digital dating abuse, $F(6, 149)=3.34$ (adjusted R^2=.08), p=.004, Durbin-Watson=1.93, Cohens f^2=0.13. Intrasexual rivalry and mate value discrepancy were significant, positive predictors of digital dating abuse, thus supporting hypothesis 2. Higher levels of intrasexual rivalry and mate value discrepancy predicted higher levels of digital dating abuse perpetration. Relationship contingent self-esteem was a non-significant predictor of digital dating abuse.

General discussion

The primary aims of this paper were to replicate and explore the relationship between mate value discrepancy and digital dating abuse using two distinct measures, and to explore mating-relevant factors associated with digital dating abuse. The findings from both studies show that when using two distinct measures of mate value, mate value discrepancy positively predicts digital dating abuse. This finding adds to the robustness of previous literature showing this association. Furthermore, when using an alternative measure of intrasexual competition which focuses on rival derogation and self-promotion tactics, we find that intrasexual competition positively predicts the perpetration of digital dating abuse. To our knowledge, this is the first paper to show that those who report high intrasexual competition engage in greater levels of digital dating abuse perpetration.

Our findings are somewhat consistent with the wider literature exploring intimate partner violence from an evolutionary perspective. For example, Graham-Kevan and Archer (2009) applied an evolutionary framework to understanding physical aggression and offline controlling behaviours in men and women. They found that both men and women of lower mate value engage in greater levels of offline controlling behaviours including physical aggression towards their partners. However, they found no relationship between controlling behaviours and physical aggression when people rated their partners to be of low mate value. The relationship between mate value discrepancy and offline dating abuse (to our knowledge) has not been explored in the literature and forms an avenue for future research. Therefore, findings from both our studies add to the literature providing an evolutionary perspective of online intimate partner violence.

As well as recognising the importance of replicating previous literature exploring evolutionary related factors in the perpetration of digital dating abuse, our findings are important given the wider context regarding concerns about the credibility of scientific research in general (Munafò et al., 2017; Nosek et al., 2012). The importance of replications lie in the fact that they are a necessary step to verify and confirm previously published work with the view of guiding future research in a more effective way (Fetterman 2015; Penders et al., 2019; Vazire 2018). The findings reported here, therefore, show that findings in scientific research can depend on measurement and ensuring that procedures involved in replication include a variety of measurements to measure the constructs researchers explore in scientific research. We replicated previous literature showing mate value discrepancy predicts the perpetration of digital dating abuse, with the use of two distinct measures not used in previous literature. Furthermore, we attempted to re-explore the role of intrasexual competition in the perpetration of digital dating

abuse, by using a measure focused on intrasexual rivalry *and* competition, as opposed to previous measures used which focus on intrasexual competition *only*.

Although replication of previous work is necessary for the advancement of psychological science, consistent with Munafò and Smith (2018), we believe that to advance theory and empirical findings, hypotheses should be tested with a wide variety of experimental measures and an attempt at triangulation. Although we have consistently shown via the use of two distinct measures that there is a relationship between mate value discrepancy and the perpetration of digital dating abuse, we have relied on correlational data. Future research could adopt a triangulation framework to address this question via a variety of approaches. This could be adopted to further explore the role of intrasexual competition in the perpetration of digital dating abuse.

Although there are strengths to the studies reported in this paper, there are notable limitations. First, we were unable to examine cultural and ethnic diversity. Both samples were recruited in the UK, and only apply to heterosexual people. Although we provide novel findings in this paper, our findings are applicable to WEIRD samples (Henrich et al., 2010). Second, the samples in both studies largely included women. As outlined in the introduction, previous research shows that the role of gender in the perpetration of digital dating abuse is inconsistent (See Taylor & Xia, 201). As a result, this gender imbalance regarding our sample may have added to the inconsistency regarding the role of gender in the perpetration of digital dating abuse. Future research should focus on recruiting a relatively equal sample of men and women, particularly when controlling for gender in statistical analyses. Third, our study relied on cross-sectional data, whereby we are unable to establish cause and effect. Fourth, many of the measures examining digital dating abuse are retrospective and rely on self-report data which may not capture the true occurrence of digital dating abuse perpetration.

Our findings, particularly the finding related to intrasexual competition should be replicated and explored in adolescents. Younger adults may engage in higher intrasexual competition than older adults as they are more likely to be actively seeking a romantic relationship than older adults who are in a secure, long-term relationship. In support, Polo et al. (2018) found that adolescents engage in intrasexual competition more so than older adults. Furthermore, due to the notion that younger adults are the highest users of technology and engage in higher intrasexual competition than older adults, perhaps younger adults may be more likely to use technology to perpetrate digital dating abuse. Future research should re-examine the relationship between intrasexual competition and digital dating abuse perpetration with a target population of younger adults. In support, Brown and Hegarty (2018) argue that researchers investigating the factors which motivate people to perpetrate digital dating abuse should aim to recruit young adults between 18-24 as they are the highest users of modern technology. Due to extent to which younger adults use technology in their daily lives, they are at an increased risk of both victimization and perpetration of digital dating abuse (Lenhart et al., 2017).

Relationship contingent self-esteem was a non-significant predictor of digital dating abuse. Although we extend the literature by not viewing self-esteem as a unified construct, and instead, focusing on relationship specific self-esteem (as suggested by Holden et al., 2018), we find no support for this association. Perhaps future research could explore the role of implicit and explicit self-esteem in the perpetration of digital dating abuse (Holden et al., 2018). Furthermore, it would be useful to look at how fragile and secure self-esteem (Zeigler-Hill et al., 2011) is related to the perpetration of digital dating abuse.

Although the focus of this paper was to explore digital dating abuse from an evolutionary perspective, previous research has also adopted a social learning approach to digital dating abuse,

finding peer-values influence perpetrators' partner-directed online violence (see Van Oytssel et al., 2017). When applied to the findings reported in this paper, it could be suggested that people engage in intrasexual competitive behaviours through observation and the attitudes of their peers and significant others. Future research could also explore the beliefs of participants significant others on dating abuse. This would enable researchers to identify whether engagement in digital dating abuse is correlated with others' endorsement of these behaviours, as found in previous research on partner-directed violence (see Sellers et al., 2005) and online partner-related behaviour such as sexting (see Van Ouytsel et al., 2017). In addition, the *cycle of violence hypothesis* which suggests that those who have experienced or witnessed specific forms of deviant behaviour are more likely to perpetrate the behaviours they have witnessed (see Heyman & Slep, 2002) which could be an explanation for our finding between intrasexual competition and digital dating abuse.

As mate value includes facets of self-esteem (such as self-rated attractiveness), it could be that self-esteem (not relationship contingent self-esteem) may moderate or mediate the relationship between mate value discrepancy and digital dating abuse. In addition, infidelity in previous relationships may mediate or moderate the relationship between high intrasexual competitiveness (being more alert of sexual rivals), and the perpetration of digital dating abuse. These are questions for future research.

Research into the perpetration of digital dating abuse can help to identify key variables which drive this behaviour. In turn, by identifying these variables and factors, it helps practitioners to design intervention to understand and prevent digital dating abuse, including the negative impact it has on victims (Van Ouytsel et al., 2017). Mate value encompasses personality as well as physical characteristics. Our findings show that when people rate themselves as having lower mate value compared to their partner, they engage in greater levels if digital dating abuse compared to those

do not have large mate value discrepancies between themselves and their partner. Therefore, preventative measures could be implemented in interventions to increase people's self-esteem and self-value. This increase in self-esteem may lead to people have greater self-mate value, and in turn decrease the perpetration of digital dating abuse.

There are important policy implications for research focuses on digital dating abuse. As digital dating abuse involves electronic intrusion in romantic relationships, interventions could focus on the dangers of sharing passwords with partners, and digital privacy when using technological devices, including the legal consequences relating to data protection issues (Van Ouytsel et al., 2017).

We tested and provided support for the hypothesis that mate value discrepancy is related to the perpetration of digital dating abuse. We used two new measures of mate value in each study of this paper, which has not been used in previous research finding this association (Bhogal & Howman, 2019; Bhogal et al., 2019). In summary, the results of this study further contribute to limited theoretical knowledge of digital dating abuse, further merging the gap between both cyber and evolutionary psychology whereby considering online behaviour from an evolutionary perspective is crucial in understanding the factors behind the way people choose to behave online (Piazza & Berring, 2009).

References

Arnocky, S., Albert, G., Carré, J. M., & Ortiz, T. L. (2018). Intrasexual competition mediates the relationship between men's testosterone and mate retention behavior. *Physiology and Behavior, 186*, 73-78. https://doi.org/10.1016/j.physbeh.2018.01.007

Arnocky, S., Sunderani, S., & Vaillancourt, T. (2013). Mate-Poaching and Mating Success in

Humans. *Journal of Evolutionary Psychology, 11*, 65-83. https://doi/10.1556/JEP.11.2013.2.2

Arnocky, S., Sunderani, S., Albert, G., & Norris, K. (2014). Sex Differences and Individual Differences in Human Facilitative and Preventive Courtship. *An International Journal on Personal Relationships, 8*(2), 210-221.

Atari, M. (2017). Assessment of Long-Term Mate Preferences in Iran. *Evolutionary Psychology, 15*(2). https://doi.org/10.1177%2F1474704917702459

Atari, M., & Jamali, R. (2016). Dimensions of Women's Mate Preferences: Validation of a Mate Preference Scale in Iran. *Evolutionary Psychology, 14*(2). https://doi/10.1177/1474704916651443

Bhogal, M. S., Rhead, C., & Tudor, C. (2019). Understanding digital dating abuse from an evolutionary perspective: Further evidence for the role of mate value discrepancy. *Personality and Individual Differences*, 151. https://doi/10.1016/j.paid.2019.109552

Bhogal, M.S., & Howman, J.M. (2019). Mate Value Discrepancy and Attachment Anxiety Predict the Perpetration of Digital Dating Abuse. *Evolutionary Psychological Science, 151*, 1-8. https://doi.org/10.1016/j.paid.2019.109552

Bennett, D. C., Guran, E. L., Ramos, M. C., & Margolin, G. (2011). College students' electronic victimization in friendships and dating relationships: Anticipated distress and associations with risky behaviors. *Violence and Victims, 26*(4), 410–429. http://dx.doi.org/10.1891/0886-6708.26.4.410.

Borrajo, E., Gámez-Guadix, M., & Calvete, A. (2015). Cyber dating abuse: prevalence, context, and relationship with offline dating aggression. *Psychological Reports, 116*(2), 565-585.

https://doi.org/10.2466/21.16.PR0.116k22w4

Brem, M. J., Spiller, L. C., Vandehey, M. A. (2014). Online Mate-Retention Tactics on Facebook Are Associated with Relationship Aggression. *Journal of Interpersonal Violence, 30*(16), 1-20. https://doi.org/10.1177%2F0886260514554286

Brown, C., & Hegarty, K. (2018). Digital Dating Abuse Measures: A Critical Review. *Aggression and Violent Behavior, 40,* 44-59. https://doi/10.1016/j.avb.2018.03.003

Buss, D. M. (1988). The evolution of human intrasexual competition: tactics of mate attraction. *Journal of Personality and Social Psychology, 54*(4), 616-628. https://doi.org/10.1037//0022-3514.54.4.616

Buss, D. M. (1989). Sex differences in human mate preferences: Evolutionary hypotheses tested in 37 cultures. *Behavioral and Brain Sciences, 12* (1), 1-14.

Buss, D. M., & Dedden, L. A. (1990). Derogation of Competitors. *Journal of Social and Personal Relationships, 7*(3), 395-422. https://doi.org/10.1177%2F0265407590073006

Burke, S. C., Wallen, M., Vail-Smith, K., & Knox, D. (2011). Using technology to control intimate partners: An exploratory study of college undergraduates. *Computers in Human Behavior*, *27*(3), 1162–1167. http://dx.doi.org/10.1016/j.chb.2010.12.010

Buunk, A. P., & Fisher, M. (2009). Individual differences in intrasexual competition. *Journal of Evolutionary Psychology, 7*(1), 37-48. https://doi/10.1556/JEP.7.2009.1.5

Davis, A. C., Desrochers, J. E., DiFilippo, A., Vaillancourt, T., & Arnocky, S. (2018). Type of jealousy differentially predicts cost-inflicting and benefit-provisioning mate retention. *Personal Relationships, 25*(4), 596-610. https://doi.org/10.1111/pere.12262

Deans, H., & Bhogal, M. S. (2019). Perpetrating cyber dating abuse: A brief report on the role of

aggression, romantic jealousy and gender. *Current Psychology: A Journal for Diverse Perspectives on Diverse Psychological Issues, 38*(5), 1077–1082. https://doi.org/10.1007/s12144-017-9715-4

Earp, B. D., Trafimow, D. (2015). Replication, falsification, and the crisis of confidence in social psychology. *Frontiers in Psychology, 6*. https://doi.org/10.3389/fpsyg.2015.00621

Edlund, J. E., & Sagarin, B. (2014). The Mate Value Scale. *Personality and Individual Differences, 64*, 74-77.

Elphinston, R. A., & Noller, P. (2011). Time to face it! Facebook Intrusion and the Implications for Romantic Jealousy and Relationship Satisfaction. *Cyberpsychology, Behavior and Social Networking, 14*(11), 631-635. https://doi.org/10.1089/cyber.2010.0318

Fetterman, A. K., & Sassenberg, K. (2015). The Reputational Consequences of Failed Replications and Wrongness Admission among Scientists. *PloS One, 10*(12), e0143723. http://doi.org/10.1037/a0039400

Fisher, M., Cox, A., Bennett, S., & Gavric, D. (2008). Components of self-perceived mate value. *Journal of Social, Evolutionary, and Cultural Psychology, 2*(4), 156-168. http://dx.doi.org/10.1037/h0099347

Goetz, C. D., & Maria, N. M. (2019). Who gets mad and who feels bad? Mate value discrepancies predict anger and shame in response transgressions in romantic relationships. *Journal of Social and Personal Relationships, 36*(10), 2963-2982. https://doi.org/10.1177%2F0265407518808092

Graham-Kevan, N., & Archer, J. (2009). Control tactics and partner violence in heterosexual relationships. *Evolution and Human Behavior, 30*, 445-452.

Hancock, K., Keast, H., & Ellis, W. (2017). The impact of cyber dating abuse on self-esteem:

The mediating role of emotional distress. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace, 11*(2), article 2. http://dx.doi.org/10.5817/CP2017-2-2

Henrich, J., Heine, S. J., & Norenzayan, A. (2010). The weirdest people in the world? *Behavioral and Brain Sciences, 33*(2-3), p. 61-83.

Heyman, R. E., & Slep, A. M. S. (2002). Do child abuse and interparental violence lead to adulthood family violence? *Journal of Marriage and Family*, *64*, 864- 870. doi:10.1111/j.1741-3737.2002.00864.x

Holden, C. J., Zeigler-Hill, V., Pham, M., & Shackelford, T. K. (2014). Personality features and mate retention strategies: Honesty-humility and the willingness to manipulate, deceive and exploit romantic partners. *Personality and Individual Differences, 57,* 31-36.

Holden, C. J., Zeigler-Hill, V., Shackelford, T. K., & Welling, L. L. M. (2018). The impact of relationship-contingent self-esteem on mate retention and reactions to threat. *Personal Relationships, 25*(4), 611-30. https://doi.org/10.1111/pere.12255

Jonason, P. K., Li, N. P., & Buss, D.M. (2010). The costs and benefits of the Dark Triad: Implications for mate poaching and mate retention tactics. *Personality and Individual Differences, 48*(4), 373-378. https://doi/10.1016/j.paid.2009.11.003

Karimi, F., Ghanbarian, E., Afhami, R., & Chegani, R. (2019). Theory-Driven Assessment of Intrasexual Rivalry. *Evolutionary Psychological Science, 5,* 286–293.

Keys, E., Bhogal, M. S. (2018). Mean Girls: Provocative Clothing Leads to Intra-sexual competition Between Females. *Current Psychology, 37*(3), 543-551.

Kirsner, B. R., Figueredo, A. J. and Jacobs, W. J. (2003). Self, friends, and lovers: Structural relations among Beck Depression Inventory scores and perceived mate values. *Journal of*

Affective Disorders, 75, 131–148. https://doi.org/10.1016/s0165-0327(02)00048-4

Knee, C. R., Canevello, A., Amspoker, A. B., & Cook, A. (2008). Relationship-contingent self-esteem and the ups and downs of romantic relationships. *Journal of Personality and Social Psychology. 95*(3), 608-27.

Lenhart, A., Ybarra, M., Zickuhr, K., & Price-Feeney, M. (2017). *Online Harassment, Digital Abuse, And Cyberstalking in America.* Data & Society Research Institute, Center for Innovative Public Health and Research. https://datasociety.net/pubs/oh/Intimate_Partner_Digital_Abuse_2017.pdf

Lewis, S. F., Travea, L., & Fremouw, W. J. (2002). Characteristics of Female Perpetrators and Victims of Dating Violence. *Violence and Victims, 17*(5), 593-606.

Lu, Y., Outysel, J. V., Walrave, M., Ponnet, K., & Temple, J. R. (2018). Cross-sectional and temporal associations between cyber dating abuse victimization and mental health and substance use outcomes. *Journal of Adolescence, 65*, 1-5. https://doi.org/10.1016/j.adolescence.2018.02.009

Machimbarrena, J. M., Calvete, E., Fernández-González, L., Álvarez-Bardón, A., Álvarez-Fernández, L., & González-Cabrera, J. (2018). Internet Risks: An Overview of Victimization in Cyberbullying, Cyber Dating Abuse, Sexting, Online Grooming and Problematic Internet Use. *International Journal of Environmental Research and Public Health, 15*(11), 2471. https://doi.org/10.3390/ijerph15112471

Miner, E. J., Starratt, V. G., & Shackelford, T. K. (2009). It's not all about her: Men's mate value and mate retention. *Personality and Individual Differences, 47*(3), 214-218. http://dx.doi.org/10.1016/j.paid.2009.03.002

Munafò, M. R., Nosek, B. A., Bishop, D. V., Button, K. S., Chambers, C. D., Du Sert, N. P., ... & Ioannidis, J. P. (2017). A manifesto for reproducible science. *Nature human behavior*, *1*(1), 1-9.

Munafò, M. R., & Smith, G. D. (2018). Robust research needs many lines of evidence. *Nature, 553*(7689), 399-401. doi:10.1038/d41586-018-01023-3

Nosek, B. A., Spies, J. R., & Motyl, M. (2012). Scientific utopia II. Restructuring incentives and practices to promote truth over publishability. *Perspectives on Psychological Science, 7*, 615-631.

Patchin, J. W., & Hinduja, S. (2011). Traditional and non-traditional bullying among youth: A test of general strain theory. *Youth & Society, 43*(2), 727-751. https://doi/10.1177/0044118X10366951

Pazhoohi, F., Jahromi, A. S., Doyle, J. F. (2016). Mate Retention Tactics Decline with Age of Iranian Men. *Evolutionary Psychological Science, 2*(3), 165-170. https://doi.org/10.1007/s40806-016-0046-8

Penders, B., Holbrook, J.B., de Rijcke, S. (2019). Rinse and repeat: Understanding the value of replication across different ways of knowing. *Publications*, *7*(3), 52.

Piazza, J., & Bering, J. M. (2009). Evolutionary cyber-psychology: Applying an evolutionary framework to Internet behavior. *Computers in Human Behavior*, *25*(6), 1258–1269. https://doi.org/10.1016/j.chb.2009.07.002

Polo, P., Fernandez, A., Muñoz-Reyes, J. A., Dufey, A., & Buunk, P. (2018). Intrasexual Competition and Height in Adolescents and Adults. *Evolutionary Psychology, 16*(1). https://doi.org/10.1177%2F1474704917749172

Reed, L. A, Tolman, R. M., & Safyer, P. (2015). Too close for comfort: Attachment insecurity

and electronic intrusion in college students' dating relationships. *Computers in Human Behavior, 50*. https://doi/10.1016/j.chb.2015.03.050

Reed, L. A., Tolman, R. M., & Ward, L. M. (2016). Gender Matters: Experiences and consequences of digital dating abuse victimization in adolescent dating relationships. *Journal of Adolescence, 59*, 79-89.

Schnurr, M. P., Mahatmya, D., & Basche, R. A. III. (2013). The role of dominance, cyber aggression perpetration, and gender on emerging adults' perpetration of intimate partner violence. *Psychology of Violence, 3*(1), 70-83. https://psycnet.apa.org/doi/10.1037/a0030601

Sellers, C. S., Cochran, J. K., & Branch, K. A. (2005). Social learning theory and partner violence: A research note. *Deviant Behavior*, *26*, 379-395. doi:10.1080/016396290931669

Smith, K., Cénat, J. M., Lapierre, A., Dion, J., Hébert., & Côté, K. (2018). Cyber dating violence: Prevalence and correlates among high school students from small urban areas in Quebec. *Journal of Affective Disorders, 234*, 220-223. https://doi.org/10.1016/j.jad.2018.02.043

Stonard, K. E., Bowen, E., Lawrence, T. R., & Price, S. A. (2014). The relevance of technology to the nature, prevalence and impact of Adolescent Dating Violence and Abuse: A Research Synthesis. *Aggression and Violent Behavior, 19*(4), 390-417. https://doi.org/10.1016/j.avb.2014.06.005

Stonard, K. E., Bowen, E., Walker, K., & Price, S. A. (2015). "They'll Always Find a Way to Get to You" Technology Use in Adolescent Romantic Relationships and Its Role in Dating Violence and Abuse. *Journal of Interpersonal Violence, 32*(14), 2083-2117. https://doi.org/10.1177/0886260515590787

Taylor, S., & Xia, Y. (2018). Cyber partner abuse: A systematic review. *Violence and Victims, 33,* 983-1011.

Teten, A. L., Ball, B., Valle, L. A., Noonan, R., & Rosenbluth, B. (2009). Considerations for the definition, measurement, consequences, and prevention of dating violence victimization among adolescent girls. *Journal of Women's Health, 18*(7), 923-927. https://doi.org/10.1089/jwh.2009.1515

Vazire, S. (2018). Implications of the credibility revolution for productivity, creativity, and progress. *Perspectives on Psychological Science*, *13*(4), 411-417.

Van Ouytsel, J., Ponnet, K., & Walgrave, M. (2017). Cyber dating abuse: investigating digital monitoring behaviors among adolescents from a social learning perspective. *Journal of Interpersonal Violence, 1-22.*

Van Ouytsel, J., Ponnet, K., Walrave, M., & d'Haenens, L. (2017). Adolescent sexting from a social learning perspective. *Telematics and Informatics*, *34*, 287-298. doi:10.1016/j.tele.2016.05.009

Villora, B., Yubero, S., & Navarro, R. (2019). Cyber Dating Abuse and Masculine Gender Norms in a Sample of Male Adults. *Future Internet, 11*(4), 84. https://doi.org/10.3390/fi11040084

Wright, M. F. (2015). Cyber aggression within adolescents' romantic relationships: Linkages to parental and partner attachment. *Journal of Youth and Adolescence, 44,* 37–47. https://doi/10.1007/s10964-014-0147-2

Zeigler-Hill, V., & Wallace, M. T. (2011). Self-esteem Instability and Psychological Adjustment. *Self and Identity, 11*(3), 1-26. https://doi.org/10.1080/15298868.2011.567763

Zweig, J. M., Dank, M., Yahner, J., & Lachman, P. (2013). The rate of cyber dating abuse among teens and how it relates to other forms of teen dating violence. *Journal of Youth and Adolescence, 42*(7), 1063-1077. https://doi.org/10.1007/s10964-013-9922-8

Table 1. Results of the hierarchical linear regression model predicting digital dating abuse from mate value discrepancy (study 1).

Variable	β	*p*	*t*	CI (95%)		Tolerance	VIF
				Lower	Upper		
Block 1							
Age	-.06	.545	-.61	-.30	.16	.894	1.119
Sex	-.21	.027	-2.25	-2.49	-.16	.963	1.038
Relationship length	.10	.333	.97	-.01	.03	.890	1.124
Block 2							
Age	-.05	.621	-.50	-.28	.17	.892	1.121
Sex	-.21	.023	-2.31	-2.42	-.18	.963	1.038
Relationship length	.08	.385	.87	-.01	.02	.888	1.126
Mate value discrepancy	.30	.001	3.31	.39	1.55	.997	1.003

Table 2**.** Correlations between all variables (study 2).

Variable	1	2	3	4
1. Digital dating abuse		.02	.23**	.17*
2.Relationship contingent self-esteem			.14	-.30**
3.Intrasexual rivalry				-.03
4.Mate value discrepancy				-----

** $p<.01$, * $p<.05$

Table 3. Results of the multiple regression predicting digital dating abuse from mate value discrepancy, relationship contingent self-esteem, and intrasexual rivalry (study 2).

Variable	β	*p*	*t*	CI (95%)		Tolerance	VIF
				Lower	Upper		
Block 1							
Age	-.22	.023	-2.29	-.27	-.02	.704	1.420
Gender	-.04	.601	-.52	-3.84	2.23	.971	1.030
Relationship length	.12	.204	1.28	-.01	.03	.722	1.385
Block 2							
Age	-.21	.024	-2.29	-.26	-.02	.687	1.456
Gender	.00	.989	.01	-3.03	3.08	.896	1.116
Relationship length	.16	.081	1.76	-.00	.04	.704	1.420
Relationship contingent self-esteem	.03	.712	.37	-.10	.14	.890	1.123
Intrasexual rivalry	.22	.006	2.78	.06	.37	.909	1.100
Mate value discrepancy	.21	.013	2.52	.05	.43	.891	1.122